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## ARITHMETIC.

Conducted by B.F.FINKEL, Kidder, Missouri. All contributions to this department should be sent to him.

### SOLUTION OF PROBLEMS.

47. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy, in New Windsor College, New Windsor, Maryland.

Mr. Merchant sells 20% above cost, with weights and measures  $12\frac{1}{2}\%$  "short," allows a discount of \$5 on every bill of \$50, and loses 5% of his sales as "bad debts." Find his *rate per cent.* of net profit, or net loss; one cent in every dollar of sales proves counterfeited, and collection-charges are  $2\frac{1}{2}\%$ .

I. Solution by H. W. DRAUGHON, Ohio, Mississippi, and the PROPOSER.

Let  $\$C$  = the cost of the merchandise sold; then  $\frac{120}{100}$  of  $\frac{8}{7}$  of  $\$C = \frac{48}{7}$  of  $\$C$  = the amount of the merchandise sold. As per the problem, the *aggregate* of deductions to be made from the *amount of the sales* is  $18\frac{1}{2}\%$ ; that is, the *net* amount of the sales is  $\frac{87\frac{1}{2}}{100}$  of  $\$C$ , and the *net* profit is  $\frac{111\frac{2}{3}}{100}$  of  $\$C$ . Hence the required rate per cent. of *net* profit must be  $11\frac{2}{3}\%$ .

II. Solution by G. B. M. ZERR, A. M., Principal of High Schools, Staunton, Virginia.

$100\% - 12\frac{1}{2}\% = 87\frac{1}{2}\%$ , what he sells for 120%.

$120\% \div 87\frac{1}{2}\% = 137\frac{1}{4}\%$ , what he gets for 100%.

\$5 on \$50 = 10%.

$10\% + 5\% + 1\% + 2\frac{1}{2}\% = 18\frac{1}{2}\%$ , what he loses.

$137\frac{1}{4}\% \times 18\frac{1}{2}\% = 25\frac{1}{3}\%$ .

$137\frac{1}{4}\% - 25\frac{1}{3}\% = 111\frac{2}{3}\%$ .  $\therefore$  he gains  $11\frac{2}{3}\%$ .

Also solved by P. S. BERG.

### PROBLEMS.

52. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

By selling a horse for  $H = \$150$  cash, I gain  $p = 20\%$ . At what price should I sell the horse and wait  $d = 90$  days, money worth  $m = 6\%$ , in order to gain  $q = 25\%$ ?

53. Proposed by P. S. BERG, Apple Creek, Ohio.

\$500

Wooster, O., Sept. 2nd, 1886.

One year after date we, or either of us promise to pay to the order of J. M. W. Five Hundred Dollars for value received with 7% annual interest from date.

J. C.

M. C.

Endorsed May 13, 1893, \$75.00

" Sept. 1, 1894, \$300.00.

What was due April 1st, 1895?